UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

Godo Kaisha IP Bridge 1 Plaintiff, v. Micron Technology, Inc.; Micron Semiconductor Products, Inc.; and Micron Technology Texas, LLC Defendants.	Civil Action No. 6:20-cv-00178 JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Godo Kaisha IP Bridge 1 ("IP Bridge") asserts the following claims for patent infringement against Defendants Micron Technology, Inc.; Micron Semiconductor Products, Inc.; and Micron Technology Texas, LLC (collectively "Micron" or "Defendants"), and alleges as follows.

NATURE OF THE ACTION

1. This is a civil action for infringement under the patent laws of the United States of America, 35 U.S.C. § 1 *et seq.*

2. IP Bridge is the owner of all rights, title, and interest in U.S. Patent Nos. 7,189,616; 6,747,320; 6,445,047; and 6,424,041 (collectively, the "Asserted Patents").

3. Defendants have infringed and continue to infringe one or more claims of IP Bridge's Asserted Patents by making, using, offering to sell, and selling within the United States, and importing into the United States, including in this District, certain memory chips and graphics memory. IP Bridge seeks injunctive relief and monetary damages.

THE PARTIES

4. Plaintiff IP Bridge is a Japanese entity with its principal place of business located at c/o Sakura Sogo Jimusho, 1-11 Kanda Jimbocho, Chiyoda-ku, Tokyo, 101-0051 Japan.

5. Defendant Micron Technology, Inc. ("Micron Technology") is a Delaware corporation with a principal place of business at 8000 South Federal Way, Boise, Idaho 83716. Micron Technology also has a place of business at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728. Micron Technology is registered with the Texas Secretary of State to do business in Texas.

6. Defendant Micron Semiconductor Products, Inc. ("Micron Semiconductor") is an Idaho corporation with a principal place of business at 8000 South Federal Way, Boise, Idaho 83716. Micron Semiconductor also has a place of business at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728. Micron Semiconductor is registered with the Texas Secretary of State to do business in Texas. Micron Semiconductor can be served through its registered agent, The Corporation Service Company, 211 E. 7th Street, Suite 620, Austin, TX 78701-3218.

7. Defendant Micron Technology Texas, LLC ("Micron Texas") is an Idaho limited liability company with a principal place of business at 8000 South Federal Way, Boise, Idaho 83716. Micron Texas also has places of business at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728; and 805 Central Expressway South #100, Allen, Texas 75013. Micron Texas can be served through its registered agent, The Corporation Service Company, 211 E. 7th Street, Suite 620, Austin, TX 78701-3218.

8. Micron is one of the largest memory chip makers in the world. It makes dynamic random access memory (DRAM), NAND Flash, and NOR Flash memory, and other memory products. Micron's products are offered under the Micron, Crucial, and Ballistix brands, as well as private labels. Micron makes its own products in semiconductor fabrication plants in the

United States and other countries throughout the world. Micron sells its products to customers, including customers in this District, in the computer, networking and storage, consumer electronics, sold-state drives, and mobile telecommunications markets.

9. Micron maintains offices in Austin and Allen, Texas. Within the United States, Micron also has offices in Folsom, Irvine, Longmont, Milpitas, San Diego, and San Jose, California; Boise and Meridian, Idaho; Minneapolis, Minnesota; Lehi, Utah; Manassas, Virginia; and Seattle, Washington.[1] Outside the United States, Micron also has offices in China, India, Japan, Korea, Malaysia, Singapore, Taiwan, Belgium, Germany, Israel, Italy, and the United Kingdom.[2]

10. Micron operates semiconductor fabrication plants in Boise, Idaho; Lehi, Utah; and Manassas, Virginia, and fabricates and manufactures DRAM products in at least Lehi, Utah and Manassas, Virginia.[3] Outside the United States, Micron operates semiconductor fabrication plants in at least China, Japan, Singapore, and Taiwan.[4]

11. Micron operates and owns the micron.com website, and markets, offers, distributes, and provides technical support for its DRAM products throughout the United States including in this District.

12. Each of the Defendants develops, designs, manufactures, distributes, markets, offers to sell, or sells infringing products or services within the United States, including in this District, and otherwise purposefully directs infringing activities to this District in connection

[1] Ex. E, https://www.micron.com/about/locations (last visited Feb. 11, 2020).
[2] *Id.*
[3] Ex. F, https://en.wikipedia.org/wiki/List_of_semiconductor_fabrication_plants (last visited Feb. 11, 2020).
[4] *Id.*

with its Austin, Texas office; its micron.com website; and its other places of business in Texas and the rest of the United States.

13. Defendants have been and are acting in concert, and are otherwise liable jointly, severally, or otherwise for relief related to or arising out of the same transaction, occurrence, or series of transactions or occurrences related to the making, using, selling, offering for sale, or otherwise distributing the DRAM products in this District.

14. In addition, this action involves questions of law and fact that are common to all Defendants. For example, Defendants are making, using, offering for sale, selling, or otherwise distributing at least some of the same DRAM products in this District.

JURISDICTION AND VENUE

15. This is a civil action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1 *et seq*. This Court has subject matter jurisdiction over the matters asserted in this Complaint under 28 U.S.C. §§ 1331 and 1338(a) and 35 U.S.C. §§ 271 *et seq*.

16. This Court has personal jurisdiction over Defendants in accordance with due process and/or the Texas Long Arm Statute because, in part, Defendants "recruit[] Texas residents, directly or through an intermediary located in this state, for employment inside or outside this state." Tex. Civ. Prac. & Rem. Code § 17.042(3).

17. This Court has personal jurisdiction over Defendants, in part because Defendants do continuous and systematic business in this District, including by providing infringing products and services to residents of this District that Defendants knew would be used within this District, and by soliciting business from residents of this District.

18. For example, Defendants are subject to personal jurisdiction in this Court because, *inter alia*, they have regular and established places of business in this District, including

offices located at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728.[5] The Travis Central Appraisal District (CAD) website[6] indicates that both Micron Technology and Micron Semiconductor own the property at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728, and that it is appraised at more the $2 million dollars.[7]

19. Micron's Austin offices are regular and established places of business at least because these locations include many members of Micron's important teams, including storage system architects, SPME system architects, storage system engineers, storage solutions engineers, and software engineers. Micron posts job openings for its Austin office,[8] and as of January 27, 2020, Micron was posting three job openings for its Austin office that were available or recently filled.[9] These and additional job postings can be found on LinkedIn and various other websites.[10]

20. Based on publicly-available information, since 2012, Micron Technology has been the employer of approximately twenty-one recipients of H-1B visas who work and reside in

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[5] Ex. G, https://www.micron.com/about/locations?country=USA&city=Austin (last visited Feb. 11, 2020).

[6] Ex. H, https://www.traviscad.org/property-search/ (last visited Feb. 11, 2020); Ex. I, http://propaccess.traviscad.org/clientdb/?cid=1 (last visited Feb. 11, 2020).

[7] Ex. J, http://propaccess.traviscad.org/clientdb/Property.aspx?prop_id=874673 (last visited Feb. 11, 2020) (property record for Micron Technology); Ex. K, http://propaccess.traviscad.org/clientdb/Property.aspx?prop_id=926072 (last visited Feb. 11, 2020) (property record for Micron Semiconductor).

[8] Ex. L, https://jobs.micron.com/search/?createNewAlert=false&q=&locationsearch=Austin (last visited Feb. 11, 2020).

[9] Ex. M, https://jobs.micron.com/job/Austin-Sr_-Ecosystem-Enabling-Manager-TX-73301/585945500/ (printed January 27, 2020); Ex. N, https://jobs.micron.com/job/Austin-Intern-Storage-Solutions-Engineer-TX-73301/617871400/ (printed January 27, 2020); Ex. O, https://jobs.micron.com/job/San-Jose-Architect%2C-Storage-System-CA-95101/615114200/ (printed January 27, 2020).

[10] Ex. P, https://www.linkedin.com/jobs/view/intern-storage-solutions-engineer-at-micron-technology-1665147174/ (last visited Feb. 11, 2020); Ex. Q, https://my.jobs/jobs/micron/architect-storage-system/1578878764707444980 (last visited Feb. 11, 2020).

the Austin, Texas area.[11] Micron Semiconductor has been the employer of at least two recipients of H-1B visas who work and reside in the Austin area.[12] Additionally, Micron Technology has been the employer of approximately twelve recipients of H-1B visas who work and reside in the Allen, Texas area.[13]

21. Micron, directly and through agents, regularly conducts, solicits, and transacts business in this District and elsewhere in Texas, including through its micron.com website. For example, Defendants employ sales and marketing employees that regularly offer to sell, sell, or otherwise distribute DRAM products in this District and elsewhere in Texas.

22. In particular, Micron has committed and continues to commit acts of infringement in violation of 35 U.S.C. § 271, and has made, used, marketed, distributed, offered for sale, and sold infringing products in Texas, including in this District, and engaged in infringing conduct within and directed at or from this District. The infringing DRAM products have been and continue to be distributed to and used in this District. Micron's acts cause injury to IP Bridge, including injury suffered within this District.

23. Venue is proper in this District under 28 U.S.C. §§ 1391 and 1400(b) because a substantial part of the events or omissions giving rise to the claims occurred in this District, and because Defendants have committed acts of infringement in this District and have a regular and established place of business in this District.

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[11] Ex. R, https://h1bdata.info/index.php?em=Micron+Technology&job=&city=Austin&year=All+Years (last visited Jan. 27, 2019); Ex. S, https://h1bdata.info/index.php?em=Micron+Technology&job=&city=ROUND+ROCK&year=All+Years (last visited Jan. 27, 2019).

[12] Ex. T, https://h1bdata.info/index.php?em=Micron+Semiconductor&job=&city=Austin&year=All+Years (last visited Jan. 27, 2019).

[13] Ex. U, https://h1bdata.info/index.php?em=Micron+Technology&job=&city=Allen&year=All+Years (last visited Jan. 27, 2019).

24. In particular, Micron Technology, Micron Semiconductor, and Micron Texas have regular and established places of business located at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728. Furthermore, Micron Technology, Micron Semiconductor, and Micron Texas are all registered to do business in Texas.

25. Micron Semiconductor and Micron Texas are wholly owned subsidiaries of Micron Technology. Micron Technology does not separately report revenue from Micron Semiconductor or Micron Texas in its filings to the Securities Exchange Commission, but rather reports combined revenue from its various products and subsidiaries.

26. On information and belief, Micron Technology not only "owns" but also "operates" Micron Semiconductor and Micron Texas, including the cooperative development, improvement, and support of Micron's products and services.

IP BRIDGE'S PATENTS

27. U.S. Patent No. 7,189,616 (the "'616 patent") is entitled "Semiconductor Memory Device with Trench-Type Stacked Cell Capacitors and Method for Manufacturing the Same" and issued on March 13, 2007. A true and correct copy of the '616 patent is attached as Exhibit A to this Complaint. IP Bridge is the owner of all rights, title, and interest in and to the '616 patent, with the full and exclusive right to bring suit to enforce the '616 patent, including the right to recover for past infringement. The '616 patent is valid and enforceable under United States patent laws.

28. The '616 patent claims are directed to a patent-eligible, non-abstract idea. They address, among other things, a specific improvement for the design and fabrication of semiconductor memory devices. The '616 patent claims are particularly useful for DRAMs or other memory devices that have trench-type stacked cell capacitors. A mask pattern layout with hole patterns may be used to etch a target film in order to fabricate the capacitors. As capacitors

have gotten smaller, there is an increased risk that adjacent capacitors may interfere with one another. By staggering the hole patterns, it is possible to fabricate capacitors that are less likely to interfere with one another, thereby, producing better and more reliable DRAMs.

29. U.S. Patent No. 6,747,320 (the "'320 patent") is entitled "Semiconductor Device with DRAM Inside" and issued on June 8, 2004. A true and correct copy of the '320 patent is attached as Exhibit B to this Complaint. IP Bridge is the owner of all rights, title, and interest in and to the '320 patent, with the full and exclusive right to bring suit to enforce the '320 patent, including the right to recover for past infringement. The '320 patent is valid and enforceable under United States patent laws.

30. The '320 patent claims are directed to a patent-eligible, non-abstract idea. They address, among other things, a specific improvement for the design and fabrication of semiconductor memory devices. The '320 patent claims are particularly useful for DRAMs or other memory devices that have a high-speed CMOS logic region. Specifically, the claims are useful for improvements of sense amplifiers in high-speed logic. In a conventional sense amplifier, a parasitic capacitor is formed on one side, which impacts the amplifier's usefulness in high-speed operation. In addition, if the mask's alignment shifts during formation of an active region or during formation of a gate electrode, the balance between pairs of transistors is degraded, reducing sensitivity of the sense amplifier. The '320 patent's claims therefore enable the difference in characteristics between a pair of sense amplifier transistors to be suppressed and the sensitivity of the sense amplifier to be enhanced.

31. U.S. Patent No. 6,445,047 (the "'047 patent") is entitled "Semiconductor Device and Method for Fabricating the Same" and issued on September 3, 2002. A true and correct copy of the '047 patent is attached as Exhibit C to this Complaint. IP Bridge is the owner of all

rights, title, and interest in and to the ’047 patent, with the full and exclusive right to bring suit to enforce the ’047 patent, including the right to recover for past infringement. The ’047 patent is valid and enforceable under United States patent laws.

32. The ’047 patent claims are directed to a patent-eligible, non-abstract idea. They address, among other things, a specific improvement for the design and fabrication of semiconductor memory devices. The ’047 patent claims are particularly useful for DRAMs or other memory devices that have surface-channel-type MOSFETs. In order to increase performance of a MOS semiconductor device, the ’047 patent recognizes that miniaturization, increasing the number of integrated devices and lowering operating voltages are required. One way to achieve this goal is by forming multiple types of surface-channel-type MOSFETs on semiconductor chips. But when forming surface-channel-type MOSFETs with relatively high threshold voltages, performance decreases as dopant concentrations increase. This can lead to shortened data retention times, and decreased carrier mobility. The ’047 patent solves these problems through the use of a first surface-channel-type MOSFET with a polysilicon film, and a second surface-channel-type MOSFET with a refractory metal film. The gate electrode of the second surface-channel-type MOSFET is made of a refractory metal or compound thereof, increasing its threshold voltage without increasing its dopant concentration.

33. U.S. Patent No. 6,424,041 (the “’041 patent”) is entitled “Semiconductor Device” and issued on July 23, 2002. A true and correct copy of the ’041 patent is attached as Exhibit D to this Complaint. IP Bridge is the owner of all rights, title, and interest in and to the ’041 patent, with the full and exclusive right to bring suit to enforce the ’041 patent, including the right to recover for past infringement. The ’041 patent is valid and enforceable under United States patent laws.

34. The ’041 patent claims are directed to a patent-eligible, non-abstract idea. They address, among other things, a specific improvement for the design and fabrication of semiconductor memory devices. The ’041 patent claims are particularly useful for DRAMs or other memory devices that have memory storage and copper wiring. While copper wiring has many benefits, copper atoms easily diffuse into silicon in silicon oxide film, causing short circuits, and into active regions of the silicon substrate, causing devices to malfunction. The ’041 patent’s claims describe an improvement that reliably prevents this diffusion of copper atoms.

35. IP Bridge’s Asserted Patents claim, among other things, a specific implementation of a solution to a problem in the design and fabrication of semiconductor devices. For example, the patents identify numerous specific advantages that IP Bridge’s claimed techniques provide compared to traditional forms of semiconductor devices. *See, e.g.*, Ex. A, ’616 patent at 3:3-36; Ex. B, ’320 patent at 1:11-2:14; Ex. C, ’047 patent at 1:5-2:12; Ex. D, ’041 patent at 1:11-2:48. Further, the claimed technologies cannot be performed as mental steps by a human, nor do they represent the application of a generic computer to any well-known method of organizing human behavior.

36. The Asserted Patents claim inventive concepts that are significantly more than any patent-ineligible, abstract idea. In particular, the claimed technologies, including individual limitations as well as ordered combinations of limitations, were not well-understood, routine, or conventional, and cover multiple advantages, and combinations of advantages, that were not well-understood, routine, or conventional. *See, e.g.*, Ex. A, ’616 patent at 16:11-41; Ex. B, ’320 patent at 7:22-8:48; Ex. C, ’047 patent at 8:58-10:14; Ex. D, ’041 patent at 9:54-12:3.

DEFENDANTS' INFRINGING PRODUCTS AND ACTIVITIES

37. Micron is a global manufacturer and supplier of memory chips. Micron's Compute and Networking Business Unit designs, makes, uses, offers to sell, sells, imports, supplies, or otherwise distributes memory chips for cloud server, enterprise, client, graphics, and networking purposes.[14] Micron's Mobile Business Unit designs, makes, uses, offers to sell, sells, imports, supplies, or otherwise distributes memory chips for smartphones and other mobile-devices.[15] Micron's Embedded Business Unit designs, makes, uses, offers to sell, sells, imports, supplies, or otherwise distributes memory chips for automotive, industrial, and consumer markets.

38. Micron designs, makes, uses, offers to sell, sells, imports, supplies, or otherwise distributes, and provides support for, memory chips, including products with the part name or number GDDR5X, and other memory chips that have the same or similar structures, features, or functionalities, and/or are made by the same or similar manufacturing processes, as the aforementioned product ("Accused Memory Chips"). An exemplary technical analysis of the Micron MT58K256M32JA-100 GDDR5X SDRAM product ("GDDR5X") is available for purchase at https://www.techinsights.com/products/0716-43012-o-5dm-100 ("TechInsights Report").

39. The Accused Memory Chips are integrated into devices made, used, offered for sale, sold, imported, supplied, or otherwise distributed in the United States by among others, Micron, Micron's customers, original equipment manufacturers ("OEMS"), original design manufacturers ("ODMs"), foundry suppliers, distributers, and other third parties. Micron's

[14] Micron's 2018 Annual Report, available at http://www.annualreports.com/Company/micron-technology-inc (last visited Feb. 11, 2020), at 3.
[15] *Id*. at 2.

Accused Memory Chips are essential, non-trivial components of the products into which they are integrated.

40. Micron also conducts research, development, and testing of Accused Memory Chips in the United States.

41. Micron maintains a website that advertised Accused Memory Chips, including identifying the applications for which they can be used and specifications for the Accused Memory Chips.

42. Micron's development, sales, marketing, and manufacturing activities in the United States, including within this District, directly contributed to Micron's net revenue in the United States.

43. IP Bridge contacted Micron by letter dated January 27, 2020, informing Micron that IP Bridge owns a patent portfolio of more than 1,100 semiconductor related patents with broad patent coverage in the United States and other countries through the world; that based upon a review of publicly available information, IP Bridge has determined that its patents may be of particular interest to Micron and its DRAM business; and that IP Bridge would welcome the opportunity to provide additional information regarding IP Bridge's patents and its licensing program on a confidential basis.

44. Micron responded by letter dated February 5, 2020 that they saw nothing in their initial review that suggested a more detailed review is warranted.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 7,189,616

45. IP Bridge incorporates by reference and re-alleges all of the foregoing paragraphs of this Complaint as if fully set forth herein.

46. Defendants have directly infringed and continue to infringe, either literally or under the doctrine of equivalents, at least claim 1 of the '616 patent by making, using, offer for

sale, selling, and importing, without authority or license, the Accused Memory Chips in violation of 35 U.S.C. § 271(a). The Accused Memory Chips are non-limiting examples that were identified based on reverse engineering reports currently available, and IP Bridge reserves the right to identify additional infringing activities, products, and services, including, for example, on the basis of information obtained during discovery.

47. Defendants have also infringed and continue to infringe under 35 U.S.C. 271(g) by importing into the United States or offering to sell, selling, or using within the United States a product which is made by a process in the United States during the term of the '616 patent. Each of the Defendants either practiced the patented process; or owns or controls, or is owned or controlled by the person who practiced the patented process. As of at least the filing date of this action, Defendants have knowledge that a patented process was used to make the Accused Memory Chips.

48. The Accused Memory Chips meet all the limitations of at least claim 1 of the '616 patent. Specifically, claim 1 of the '616 patent recites:

> A method for manufacturing a semiconductor memory device comprising:
>
> depositing an interlayer insulating film on a semiconductor substrate provided with contact plugs;
>
> patterning a mask pattern on the interlayer insulating film, the mask pattern having a layout in which a plurality of hole patterns having the same shape are arranged in a stagger manner so that side edges of the adjacent hole patterns are only partially opposite to each other;
>
> forming holes for storage nodes in the interlayer insulating film by etching with the mask pattern;
>
> forming the storage nodes in the holes so as to be connected electrically to the contact plugs;
>
> forming a capacitor insulating film on the storage nodes; and
>
> forming a plate electrode on the capacitor insulating film,

> wherein the length of a portion where the opposing capacitors are overlapped in the mask layout is set so that the value of the parasitic capacitance between adjacent cell capacitors is not more than 10% of the set cell capacitance value.

49. The Accused Memory Chips are formed using a method for manufacturing a semiconductor memory device. For example, Micron manufactures the GDDR5X, which is a semiconductor memory device. *TechInsights Report* at 1.

50. The Accused Memory Chips are formed by depositing an interlayer insulating film on a semiconductor substrate provided with contact plugs. For example, the GDDR5X has a substrate. *Id.* at 16, 89.

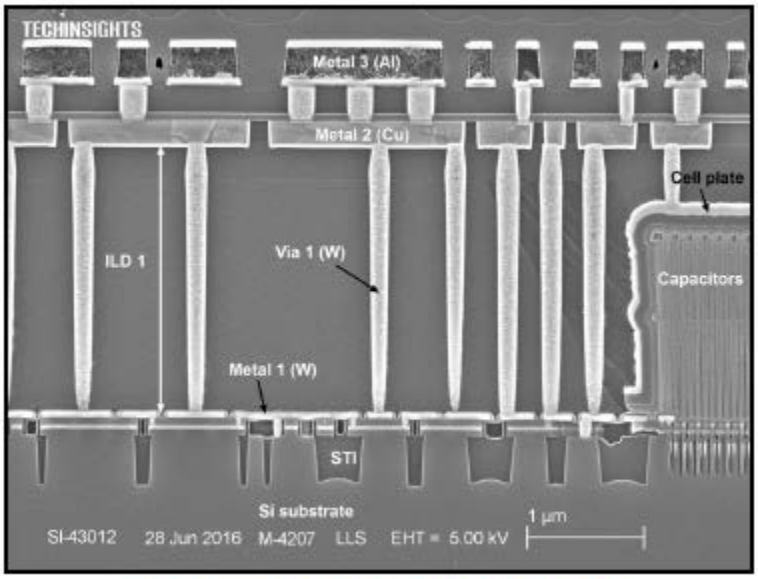

Figure 4.1.1:Left edge of DRAM array (SEM)

Id. at 89.

51. The GDDR5X is formed by depositing an interlayer insulating film (*see* SiN regions) on a semiconductor substrate provided with contact plugs (*see* regions labelled "storage node plug"). *Id.* at 121.

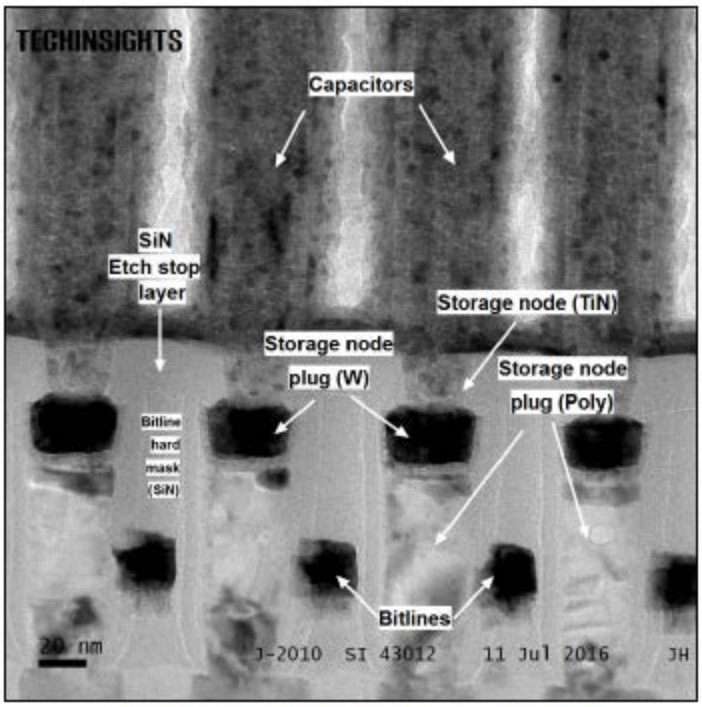

Figure 5.3.3: Storage node W/polysilicon plug at top (TEM)

Id.

52. The Accused Memory Chips are formed by patterning a mask pattern on the interlayer insulating film, the mask pattern having a layout in which a plurality of hole patterns having the same shape are arranged in a stagger manner so that side edges of the adjacent hole patterns are only partially opposite to each other. For example, the GDDR5X is formed by patterning a mask pattern on the interlayer insulating film (*see* SiN regions), the mask pattern having a layout in which a plurality of hole patterns having the same shape are arranged in a stagger manner so that side edges of the adjacent hole patterns are only partially opposite to each other. *Id.* at 78, 121.

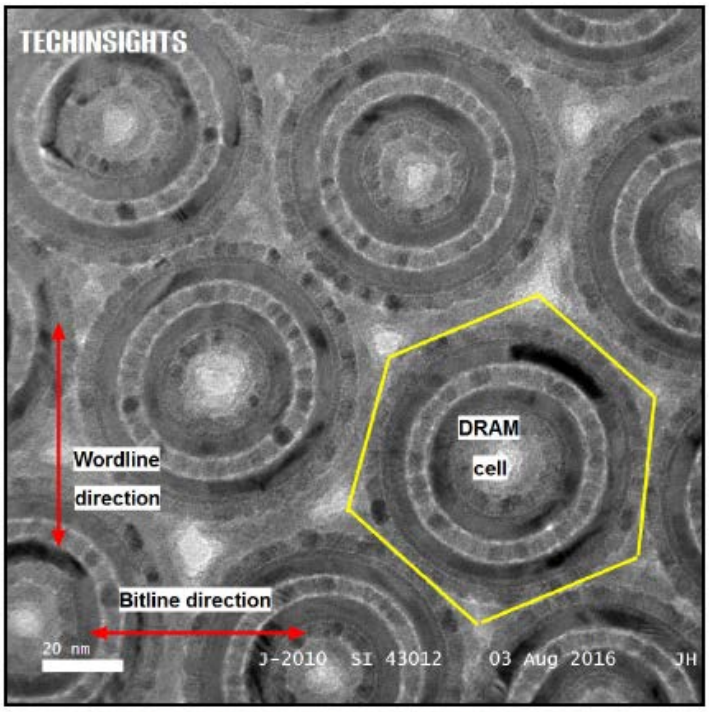

Figure 3.1.7: DRAM array, capacitor storage node level (TEM)

Id. at 78.

53. The Accused Memory Chips are formed by forming holes for storage nodes in the interlayer insulating film by etching with the mask pattern. For example, the GDDR5X is formed by forming holes for storage nodes in the interlayer insulating film by etching with the mask pattern. *Id.* at 78, 84, 121.

54. The Accused Memory Chips are formed by forming the storage nodes in the holes so as to be connected electrically to the contact plugs. For example, the GDDR5X is formed by forming the storage nodes in the holes so as to be connected electrically to the contact plugs. *Id.* at 78, 84, 121

55. The Accused Memory Chips are formed by forming a capacitor insulating film on the storage nodes. For example, the GDDR5X is formed by forming a capacitor insulating film on the storage nodes. *Id.* at 78, 84, 121.

56. The Accused Memory Chips are formed by forming a plate electrode on the capacitor insulating film. For example, the GDDR5X is formed by forming a plate electrode on the capacitor insulating film. *Id.* at 78, 84, 121.

57. In the Accused Memory Chips, the length of a portion where the opposing capacitors are overlapped in the mask layout is set so that the value of the parasitic capacitance between adjacent cell capacitors is not more than 10% of the set cell capacitance value. For example, in the GDDR5X, the length of a portion where the opposing capacitors (*see* DRAM cells) are overlapped in the mask layout is set so that the value of the parasitic capacitance between adjacent cell capacitors is not more than 10% of the set cell capacitance value. *Id.* at 78, 84, 121.

58. The foregoing allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Accused Memory Chips. IP Bridge reserves the right to modify this description, including, for example, on the basis of information about the Accused Memory Chips that it obtains during discovery.

59. IP Bridge has made a reasonable effort to determine the process used by Defendants to produce the Accused Memory Chips. The TechInsights Report demonstrates a substantial likelihood that the Accused Memory Chips were made using IP Bridge's patented process. Pursuant to 35 U.S.C. § 295, the Accused Memory Chips should be presumed to have been so made, and the burden of establishing that the product was not made by the process shall be on Defendants, to the extent they assert that it was not so made.

60. Defendants' infringement has damaged and continues to damage IP Bridge in an amount yet to be determined, of at least a reasonable royalty.

61. This is an exceptional case. IP Bridge is entitled to attorneys' fees and costs under 35 U.S.C. § 285 as a result of the infringement of the '616 patent by Defendants.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 6,747,320

62. IP Bridge incorporates by reference and re-alleges all of the foregoing paragraphs of this Complaint as if fully set forth herein.

63. Defendants have directly infringed and continue to infringe, either literally or under the doctrine of equivalents, at least claim 1 of the '320 patent by making, using, offer for sale, selling, and importing, without authority or license, the Accused Memory Chips in violation of 35 U.S.C. § 271(a). The Accused Memory Chips are non-limiting examples that were identified based on reverse engineering reports currently available, and IP Bridge reserves the right to identify additional infringing activities, products, and services, including, for example, on the basis of information obtained during discovery.

64. The Accused Memory Chips meet all the limitations of at least claim 1 of the '320 patent. Specifically, claim 1 of the '320 patent recites:

> A semiconductor device comprising a DRAM region and a high-speed CMOS logic region that are co-resident with each other,
>
> wherein a pair of gate electrodes of a N-type sense amplifier transistor and a pair of gate electrodes of a P-type sense amplifier transistor constituting a CMOS sense amplifier of the DRAM are disposed respectively in one active region in parallel to each other in the same direction as that of bit lines, and
>
> a pair of adjacent N-type sense amplifier transistors and a pair of adjacent P-type sense amplifier transistors are isolated by shallow trench isolation (STI) regions.

65. The Accused Memory Chips are, or contain, semiconductor device comprising a DRAM region and a high-speed CMOS logic region that are co-resident with each other. For example, Micron's GDDR5X is a semiconductor integrated circuit device. *TechInsights Report*

at xiii, 1, 13. The GDDR5X has a DRAM region and a high-speed CMOS logic region that are co-resident with each other.

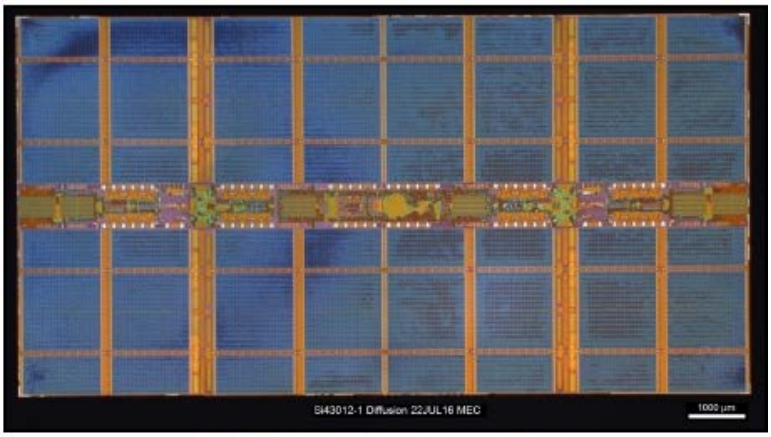

Figure 1.2.2: Die photograph at diffusion level

TechInsights Report at 5.

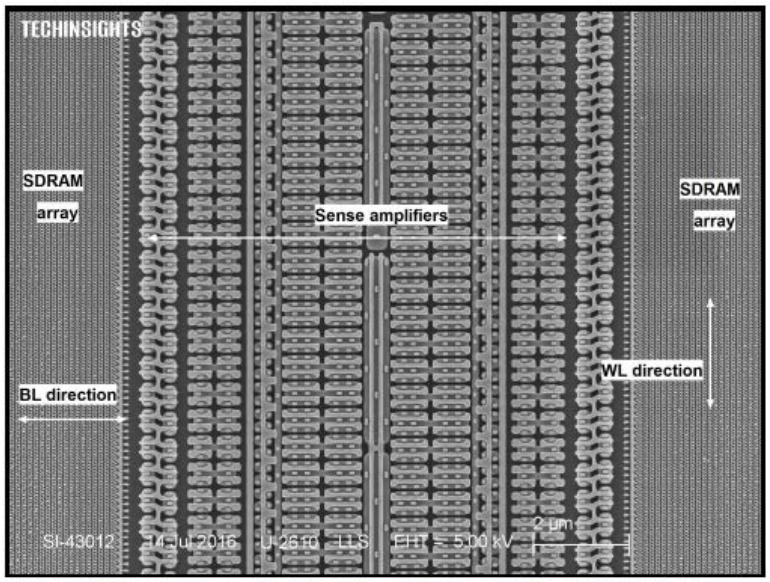

Figure 3.2.2: Array edge with sense amplifiers, poly level (SEM)

TechInsights Report at 80.

66. The Accused Memory Chips include a pair of gate electrodes of an N-type sense amplifier transistor and a pair of gate electrodes of a P-type sense amplifier transistor that constitute a CMOS sense amplifier of a DRAM. *TechInsights Report* at 80.

67. In the Accused Memory Chips, the pair of gate electrodes of the N-type sense amplifier transistor and the pair of gate electrodes of the P-type sense amplifier transistor are disposed respectively in one active region in parallel to each other, in the same direction as the bit lines. *TechInsights Report* at 80, 90.

68. In the Accused Memory Chips, a pair of adjacent N-type sense amplifier transistors and a pair of adjacent P-type sense amplifier transistors are isolated by shallow trench isolation (STI) regions. *TechInsights Report* at 80, 90.

69. The foregoing allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Accused Memory Chips. IP Bridge reserves the right to modify this description, including, for example, on the basis of information about the Accused Memory Chips that it obtains during discovery.

70. Defendants' infringement has damaged and continues to damage IP Bridge in an amount yet to be determined, of at least a reasonable royalty.

71. This is an exceptional case. IP Bridge is entitled to attorneys' fees and costs under 35 U.S.C. § 285 as a result of the infringement of the '320 patent by Defendants.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 6,445,047

72. IP Bridge incorporates by reference and re-alleges all of the foregoing paragraphs of this Complaint as if fully set forth herein.

73. Defendants have directly infringed and continue to infringe, either literally or under the doctrine of equivalents, at least claims 2 and 4 of the '047 patent by making, using, offer for sale, selling, and importing, without authority or license, the Accused Memory Chips in violation of 35 U.S.C. § 271(a). The Accused Memory Chips are non-limiting examples that were identified based on reverse engineering reports currently available, and IP Bridge reserves

the right to identify additional infringing activities, products, and services, including, for example, on the basis of information obtained during discovery.

74. The Accused Memory Chips meet all the limitations of at least claims 2 and 4 of the ’047 patent. Specifically, base claim 1 and dependent claims 2 and 4 of the ’047 patent recite:

> 1. A semiconductor device comprising:
>
> a first-surface-channel-type MOSFET with a first threshold voltage; and
>
> a second-surface-channel-type MOSFET with a second threshold voltage having an absolute value greater than an absolute value of said first threshold voltage,
>
> wherein the first-surface-channel-type MOSFET includes:
>
> a first gate insulating film formed on a semiconductor substrate; and
>
> a first gate electrode, which has been formed out of a poly-silicon film formed directly on the first gate insulating film, and
>
> wherein the second-surface-channel-type MOSFET includes:
>
> a second gate insulating film formed on the semiconductor substrate; and
>
> a second gate electrode, which has been formed out of a refractory metal film formed directly on the second gate insulating film, the refractory metal film being made of a refractory metal or a compound thereof.
>
> 2. The device of claim 1, wherein a dopant concentration in the channel region of the second-surface-channel-type MOSFET is lower than a dopant concentration in the channel region of the first-surface-channel-type MOSFET.
>
> 4. The device of claim 1, wherein the first-surface-channel-type MOSFET is formed in a logic circuit block of the semiconductor substrate, and
>
> wherein the second-surface-channel-type MOSFET is formed in a memory cell block of the semiconductor substrate, and
>
> wherein the second gate insulating film is thicker than the first gate insulating film.

75. The Accused Memory Chips are, or contain, a semiconductor device. For example, Micron's GDDR5X is a semiconductor integrated circuit device. *TechInsights Report* at 1.

76. The Accused Memory Chips include a first-surface-channel-type MOSFET with a first threshold voltage (*see, e.g.*, LV peripheral transistors), and a second-surface-channel-type MOSFET with a second threshold voltage (*see, e.g.*, recessed channel access transistors). *TechInsights Report* at 29, 92.

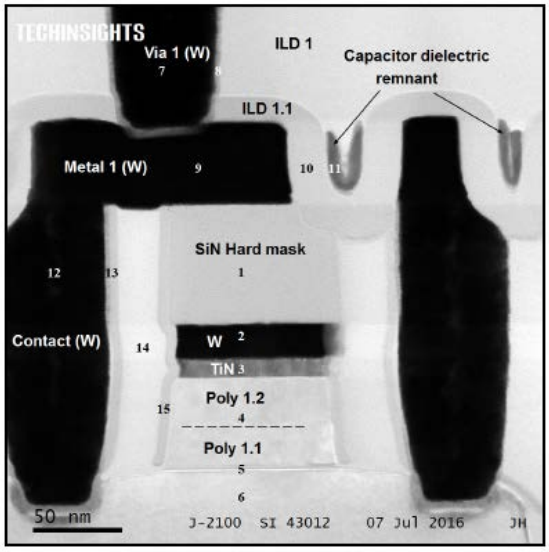

Figure 2.3.6: TEM-EDS analysis locations in LV peripheral transistor area (BF-TEM)

TechInsights Report at 29.

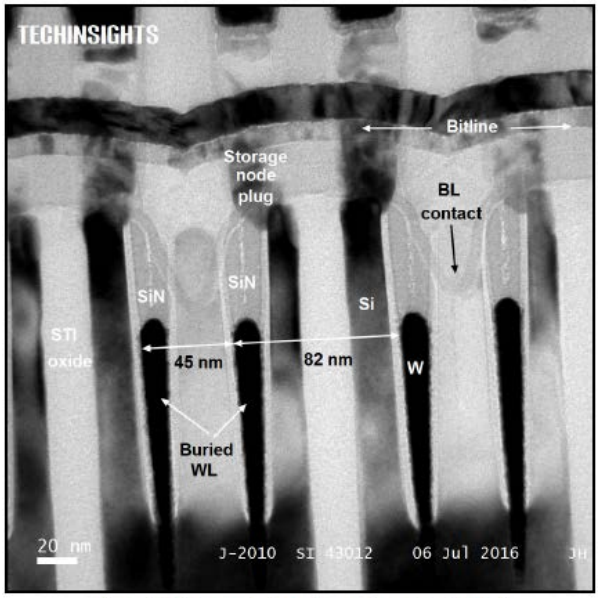

Figure 4.2.2:Recessed channel access transistors (RCAT) andbitline contact (TEM)

TechInsights Report at 92.

77. In the Accused Memory Chips, the absolute value of the threshold voltage of the second surface-channel-type MOSFET (*e.g.*, recessed channel access transistors) is greater than the absolute value of the threshold voltage of the first surface-channel-type MOSFET (*e.g.*, LV peripheral transistors). *TechInsights Report* at 29, 92.

78. In the Accused Memory Chips, the first surface-channel-type MOSFET includes a first gate insulating film (*see, e.g.*, gate oxide) formed on a semiconductor substrate, and a first

gate electrode formed out of a poly-silicon film (*see, e.g.*, Poly 1.1) formed directly on the first gate insulating film. *TechInsights Report* at 29, 27.

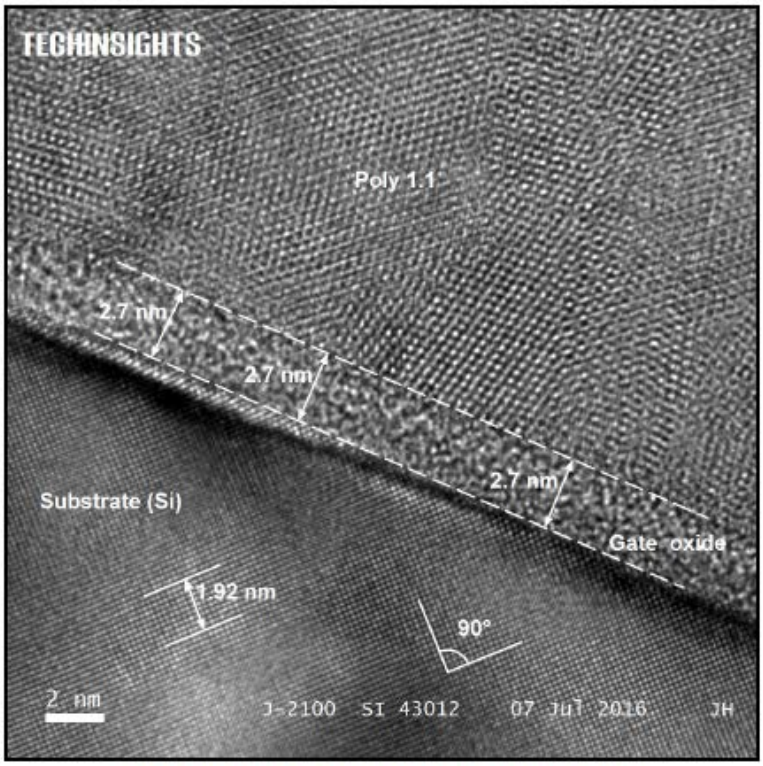

Figure 2.3.3: Peripheral transistor gate dielectric (TEM)

Id. at 27.

79. In the Accused Memory Chips, the second surface-channel-type MOSFET includes a second gate insulating film (*see, e.g.*, oxide) formed on the semiconductor substrate, and a second gate electrode formed out of a refractory metal film (*see, e.g.*, TiN). *TechInsights Report* at 92, 95.

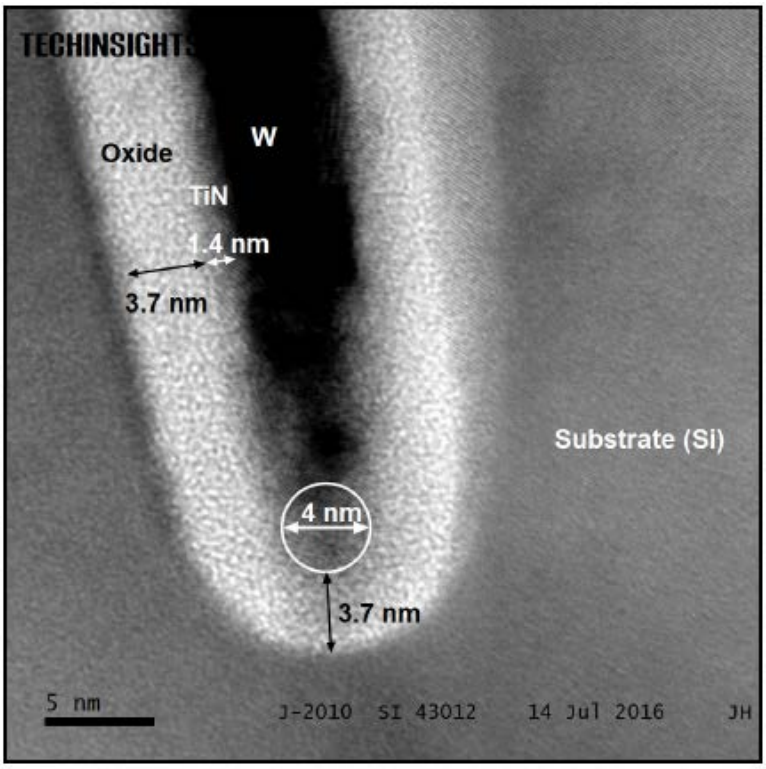

Figure 4.2.6: Buried wordline at the bottom (TEM)

Id. at 95.

80. In the Accused Memory Chips, the refractory metal film is made of a refractory metal or a compound thereof (*see, e.g.*, TiN). *TechInsights Report* at 92, 95.

81. On information and belief, in the Accused Memory Chips, the dopant concentration in the channel region of the second surface-channel-type MOSFET (*e.g.*, recessed channel access transistors) is lower than the dopant concentration in the channel region of the first surface-channel-type MOSFET (*e.g.*, LV peripheral transistors). *See TechInsights Report* at 29, 92.

82. In the Accused Memory Chips, the first surface-channel-type MOSFET is formed in a logic circuit block of the semiconductor substrate. *TechInsights Report* at 25, 29.

83. In the Accused Memory Chips, the second surface-channel-type MOSFET is formed in a memory cell block of the semiconductor substrate. *TechInsights Report* at 73, 89-92.

84. In the Accused Memory Chips, the second gate insulating film is thicker than the first gate insulating film. *TechInsights Report* at 27, 95.

85. The foregoing allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Accused Memory Chips. IP Bridge reserves the right to modify this description, including, for example, on the basis of information about the Accused Memory Chips that it obtains during discovery.

86. Defendants' infringement has damaged and continues to damage IP Bridge in an amount yet to be determined, of at least a reasonable royalty.

87. This is an exceptional case. IP Bridge is entitled to attorneys' fees and costs under 35 U.S.C. § 285 as a result of the infringement of the '047 patent by Defendants.

COUNT IV: INFRINGEMENT OF U.S. PATENT NO. 6,424,041

88. IP Bridge incorporates by reference and re-alleges all of the foregoing paragraphs of this Complaint as if fully set forth herein.

89. Defendants have directly infringed and continue to infringe, either literally or under the doctrine of equivalents, at least claim 1 of the '041 patent by making, using, offer for sale, selling, and importing, without authority or license, the Accused Memory Chips in violation of 35 U.S.C. § 271(a). The Accused Memory Chips are non-limiting examples that were identified based on reverse engineering reports currently available, and IP Bridge reserves the right to identify additional infringing activities, products, and services, including, for example, on the basis of information obtained during discovery.

90. The Accused Memory Chips meet all the limitations of at least claim 1 of the '041 patent. Specifically, claim 1 of the '041 patent recites:

> A semiconductor device, comprising:
>
> a semiconductor substrate,

a memory storage portion on a main surface of said semiconductor substrate,

a wiring portion including a copper wire positioned on the main surface of said semiconductor substrate and apart from said memory storage portion, and

copper-diffusion blocking means provided in a region surrounding the memory storage portion for blocking copper diffusion from said wiring portion toward said memory storage portion.

91. The Accused Memory Chips are, or contain, a semiconductor device. For example, Micron's GDDR5X is a semiconductor integrated circuit device. *TechInsights Report* at 1.

92. The Accused Memory Chips include a semiconductor substrate. *TechInsights Report* at 13.

93. The Accused Memory Chips include a memory storage portion on a main surface of the semiconductor substrate (*see, e.g.*, DRAM capacitors). *TechInsights Report* at 13.

94. The Accused Memory Chips include a wiring portion including copper wire positioned on the main surface of the semiconductor substrate, apart from the memory storage portion. *TechInsights Report* at 13, 52.

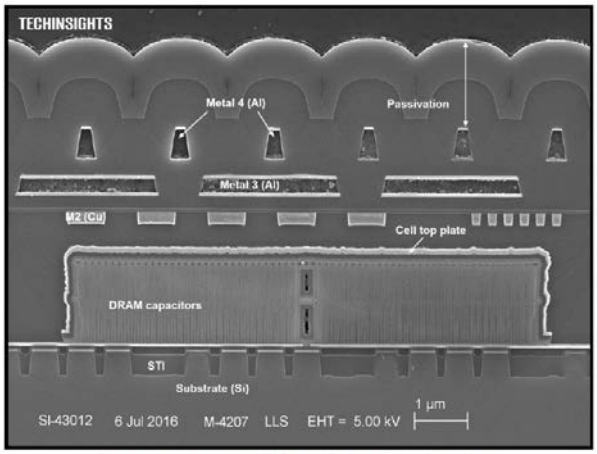

Figure 2.0.1: General View of DRAM device (SEM)

TechInsights Report at 13.

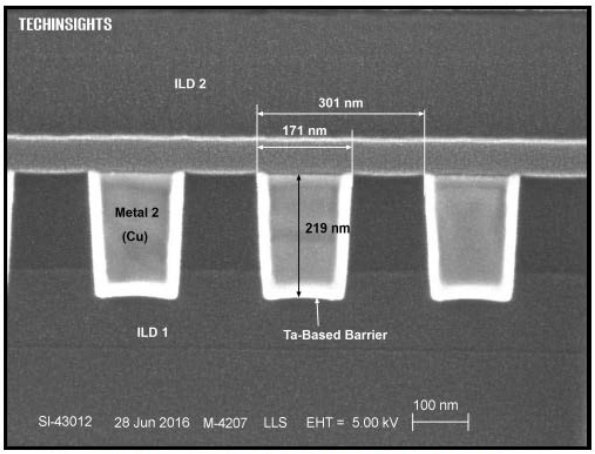

Figure 2.5.4: Minimum pitch metal 2 lines (SEM)

TechInsights Report at 52.

95. In the Accused Memory Chips, a copper-diffusion blocking means (*see, e.g.*, tungsten cell plate) is provided in a region surrounding the memory storage portion (*see, e.g.*, DRAM capacitors) for blocking copper diffusion from the wiring portion toward the memory storage portion. *TechInsights Report* at 13, 88.

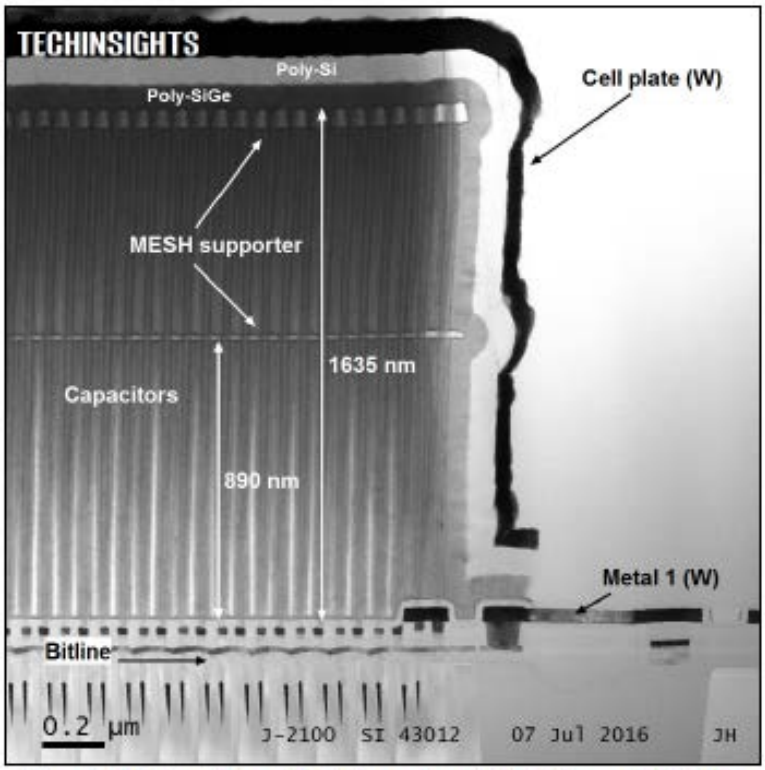

Figure 4.0.1: General view of DRAM array edge with MESH support (BF-TEM)

Id. at 88.

96. The foregoing allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Accused Memory Chips. IP Bridge reserves the right to modify this description, including, for example, on the basis of information about the Accused Memory Chips that it obtains during discovery.

97. Defendants' infringement has damaged and continues to damage IP Bridge in an amount yet to be determined, of at least a reasonable royalty.

98. This is an exceptional case. IP Bridge is entitled to attorneys' fees and costs under 35 U.S.C. § 285 as a result of the infringement of the '041 patent by Defendants.

REQUEST FOR A JURY TRIAL

99. IP Bridge requests a jury trial of all issues in this action so triable.

PRAYER FOR RELIEF

WHEREFORE, IP Bridge respectfully requests:

A. That Judgment be entered that Defendants have infringed one or more claims of the Asserted Patents, literally and under the doctrine of equivalents;

B. That, in accordance with 35 U.S.C. § 283, Defendants and all its affiliates, employees, agents, officers, directors, attorneys, successors, and assigns and all those acting on behalf of or in active concert or participation with any of them, be preliminarily and permanently enjoined from (1) infringing the Asserted Patents and (2) making, using, selling, and offering for sale, or importing into the United States, the Accused Products;

C. An award of damages sufficient to compensate IP Bridge for Defendants' infringement under 35 U.S.C. § 284;

D. That the case be found exceptional under 35 U.S.C. § 285 and that IP Bridge be awarded its reasonable attorneys' fees;

E. Costs and expenses in this action;

F. An award of prejudgment and post-judgment interest; and

G. Such other and further relief as the Court may deem just and proper.

Dated: March 9, 2020

Respectfully submitted,

By: /s/ B. Russell Horton

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